Meteorological stations thus far have been established at Baba, Barraganetal, Chobo, Rocafuerte, and Tonguel, to which 45 others are being selected.

IS VENUS CLOUD COVERED?

Mr. Evershed has taken many photographs of the spectrum of Venus in recent years for the purpose (inter alia) of endeavoring to detect the Einstein shift and of testing his own hypothesis that the earth has an effect on the atmospheric circulation of the sun. In the course of this work he found, to his surprise, that a much longer exposure time was needed than was the case in photographing the spectrum of a cumulus cloud on which the sun was shining (Monthly Notices R. A. S., November). Mr. Evershed expected the time to be shorter, for the intensity of sunlight on Venus is 1.92 times as great as on the earth. Allowing for the absorption of Venus's atmosphere, he concludes that if Venus were covered with clouds similar to our cumulus clouds the exposed time would be less on the former than on the latter in the ratio of 1 to 1.3, whereas the contrary is the case. He concludes that the atmosphere of Venus is not cloud laden, but that its lower strata contain much dust in suspension, veiling the surface features. This conclusion is similar to that reached by Prof. Lowell from his observations at Flagstaff.

Mr. Evershed thinks that the values of the color indices assigned by Prof. N. H. Russell to the sun and Venus (+0.79 m. and +0.78 m.) are mutually inconsistent, since they imply that no selective absorption takes place in Venus's atmosphere. Mr. Evershed finds evidence of decided selective absorption in the violet, as compared with his cloud spectra.—*Nature* (London), Feb. 19, 1920, p. 675.

REFERENCES TO LITERATURE ON ICE CAVES.

The explanation of the phenomena 'observed' in the ice cave at Coudersport, Pa. (*Scientific American*, May 6, 1919, pp. 470 and 495, reprinted in MONTHLY WEATHER REVIEW, Nov., 1919, pp. 803–804), is looked upon with some doubt, in view of the well-understood conditions in many such caves in various parts of the world. There is one proposition that indicates possible formation of ice in the summer time, namely, when air is so dry that the dewpoint is below the freezing point. This, however, is unlikely. In most cases heavy ice is formed late in winter and does not melt until far into the summer time. The following references supply much information on this subject:

Glacières, or freezing caverns. E. S. Balch, Philadelphia, 1900. 326 pp. Includes bibliography.

The Sweden-Valley ice mine and its explanation. M. O. Andrews. *Popular Science Monthly*, vol. 82, 1913, pp. 280–288.

Ice caves. A. M. Miller. *Science*, N. S. 37, 1913, pp. 980–981.

Iowa Geological Survey, Annual Report, vol. XVI, 1905, pp. 142–146. Includes references.

Ice caves and frozen wells as meteorological phenomena. H. H. Kimball. MONTHLY WEATHER REVIEW, vol. XXIX, 1901, pp. 366–371. Gives references.

Ice caves and freezing wells. MONTHLY WEATHER REVIEW, vol. XXIX, 1901, pp. 509–510.

The Decorah ice cave and its explanation. A. F. Kovarik. *Scientific American Supplement*, vol. 46, 1898, pp. 19158–19159.

Ice caves of France and Switzerland. Rev. G. F. Browne, London, 1865. 315 pp.

Geology and mineral deposits of the Colville Indian Reservation, Washington. J. T. Pardee. *U. S. Geological Survey Bulletin* 677, 1918. pp. 170–171.

—*W. J. Humphreys.*

ROUND THE WORLD ON A VOYAGE OF 1,000 MILES.

After a voyage of 76 days from Melbourne, the barque *Inverneill* arrived at Bunbury, western Australia, on July 6 for Bunbury to load jarrah for South Africa, and soon after clearing Port Phillip Heads she struck a strong westerly gale, which continued for days. The vessel was driven out of her course, and through the straits. When on the other side of Wilsons Promontory the wind veered west, and the vessel was driven up the New South Wales coast. When the *Inverneill* was to the south of Sydney Heads the weather moderated, and so the captain decided to go on to Sydney.

After a short stay in Sydney he left again, and found the westerly winds still at their height. He then decided that instead of crossing the Bight he would go with the westerly wind around the world. Five days after setting sail he found himself at the north end of New Zealand, having gone a distance of approximately 1,200 nautical miles. This he considered a remarkably good record. As an average the barque traveled 240 miles a day. In 28 more days he was rounding the Horn with the wind still in a helpful direction. His trip continued for a further 33 days, when he found himself at St. Paul Island in the mid-Indian Ocean. From thence on to Bunbury the trip took 16 days. The trip was a fast one, owing to the steady westerly winds. Capt. Shippen himself estimated that the voyage would take approximately 95 days, whereas the trip from Sydney to Bunbury occupied but 76 days. Altogether Capt. Shippen estimates that he traveled 14,500 miles in his endeavor to go from Melbourne to Bunbury, and his average sailing time was 292 miles a day. He considers that such a passage has never been made before by a mariner, and expresses the opinion that he is doubtful if it will ever be repeated.—*Liverpool Journal of Commerce.*

THE WAVE-RAISING POWER OF NORTHWEST AND SOUTH WINDS COMPARED.

Mr. C. Kennedy, meteorological observer for the Weather Bureau on the British S. S. *Indian*, Capt. I. Chadwick, in a recent communication, asks the following interesting question:

> Why it is, that when we experience a wind from a northerly direction, especially northwesterly, the sea rises very quickly? On the contrary, if we experience a southerly wind, and if of a strong force, there is very little sea. This is in northern latitudes.

The following explanation of the point raised by Mr. Kennedy has been offered by Prof. W. J. Humphreys and Dr. C. F. Brooks of the Weather Bureau:

(1) Northwest winds usually are stronger than southerly winds over the America-to-England trade routes of the Atlantic and for this reason alone should give larger waves, since the wave effect increases at first much faster than the strength of the wind.

(2) Over much of this route the winds of winter (season of rough water) are prevailingly northwest. Hence, there usually are some waves of the northwest-wind type, due either to actual winds at the time and place, or to persistence of waves from more or less previous and distant storms. Any freshening of the northwest wind would then only increase the existing wave system. The crests of the existing waves would lie at right angles, roughly, to the new wind, and their sides would be exposed to its maximum pressure. On the other hand a wind from the south would, at first, meet with less surface obstruction (because blowing rather along the waves than against their sides) and thus be less efficient in raising a sea.

(3) A given wind has a greater wave-producing effect on an already rough sea than on a smooth one. Hence, as the ocean generally is rougher in winter than in summer, owing largely to the greater frequency and severity of storms during the cold season than during the warm one, it follows that a given winter wind (usually northwest) is likely to produce a higher sea than is an equal summer wind (usually